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IN THE CLAIMS:

1. (Currently Amended) Programmable adapter device for communicating between a higher level communication protocol supported by a higher level equipment (30) and at least one lower level communication protocol supported by the a lower level automation equipment (40), the device comprising an adapter (20) fitted with comprising a processing unit (21) capable of for executing program instructions, a first higher level interface (23) that can connect for connecting with a second higher level interface (32) in the such higher level equipment (30), and a first lower level interface (24) that can connect for connecting with a second lower level interface (42) on the in such lower level equipment (40), wherein:

• the the adapter (20) comprises a first memory (25) containing for storing a conversion program (15) for converting between the higher level protocol and a lower level protocol, that can be after being downloaded from the a higher level equipment (30) equipment, and for being executed by the processing unit (21) in the adapter (20),

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• ~~the~~ the adapter (20) comprises a second non-volatile memory ~~(26)~~ containing a resident driver program ~~(16)~~ that can be executed for execution by the processing unit (21) in order to initialise initialize communication with the higher level equipment ~~(30)~~ using the higher level communication protocol and download ~~the~~ conversion program ~~(15)~~ into the first memory ~~(25)~~.

2. (Currently Amended) ~~Adapter~~ The adapter device according to claim 1, wherein the first memory ~~(25)~~ ~~of the adapter (20)~~ is a volatile memory.

3. (Currently Amended) ~~Adapter~~ The adapter device according to claim 2, wherein the first memory ~~(25)~~ ~~of the adapter (20)~~ ~~contains~~ comprises a buffer memory area ~~(17)~~ used for use by the conversion program ~~(15)~~ to adapt to asynchronism between the higher level and lower level protocols.

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4. (Currently Amended) ~~Adapter~~ The adapter device according to claim 3, wherein the conversion program (15) ~~executed by the processing unit (21) stores~~ is for storing messages received from a lower level equipment (40) in the buffer memory area (17) before passing ~~them~~ such messages onto ~~the~~ a higher level equipment (30).

5. (Currently Amended) ~~Adapter~~ The adapter device according to claim 3, wherein the conversion program (15) ~~executed by the processing unit (21) stores~~ is for storing messages received from the higher level equipment (30) in the buffer memory area (17) before passing ~~them~~ such messages onto a lower level equipment (40).

6. (Currently Amended) ~~Adapter~~ The adapter device according to claim 1, further comprising a lower level connecting cable (14) ~~between~~ connecting the lower level interface (24) of the adapter (20) and with the lower level interface (42) of ~~the~~ a lower level equipment (40), wherein the lower level connecting cable (14) ~~contains~~ comprises integrated recognition means, detectable when the cable (14) is connected to the lower level interface (24) of the adapter (20), enabling the processing unit (21) of the adapter (20) to determine a complete identifier (18b) or a partial

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identifier ~~(18a)~~ of the lower level protocol using the resident driver program ~~(16)~~.

7. (Currently Amended) ~~Adapter~~ The adapter device according to claim 6, wherein the complete identifier ~~(18b)~~ or the partial identifier ~~(18a)~~ of the lower level protocol is ~~memorized~~ stored in the first memory ~~(25)~~ of the adapter ~~(20)~~.

8. (Currently Amended) ~~Adapter~~ The adapter device according to claim 1 in combination with a higher lever equipment, wherein ~~the device also comprises a storage area (35) in the higher level equipment (30) in order to store one or several~~ additional comprising a storage area for storing at least one conversion programs (15, 15') program for communicating between the a higher level protocol and a lower level protocol, that can be downloaded in and for downloading said program into the first memory (25) of the adapter (20).

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9. (Currently Amended) ~~Adapter~~ The adapter device according to claim 8, wherein the higher level equipment (30) comprises at least one lower level protocol driver (33) and at least one peripheral driver (34) supporting a serial communication interface, such that the lower level protocol driver (33) ~~communicates~~ is for communicating with the peripheral driver (34) through this said serial communication interface.

10. (Currently Amended) ~~Adapter~~ The adapter device according to claim 9, wherein the peripheral driver (34) of the a higher level equipment (30) ~~uses~~ is for using different communication channels as a function of the criticality of the ~~messages to be~~ being transmitted, to exchange messages with the resident driver program ~~(16)~~.

11. (Currently Amended) ~~Adapter~~ The adapter device according to claim 1, wherein the ~~USB protocol is used as the~~ higher level communication protocol is the USB protocol.

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12. (Currently Amended) ~~Adapter~~ The adapter device according to claim 11, wherein the adapter ~~(20) is supplied by the~~ comprises a USB interface ~~of~~ for communicating with the higher level equipment ~~(30)~~.

13. (Currently Amended) ~~Adapter~~ The adapter device according to claim 1, wherein the higher level communication protocol is the BLUETOOTH protocol.

14. (Currently Amended) ~~Adapter~~ The adapter device according to claim 1, wherein the higher level communication protocol is a protocol ~~conform~~ in conformance with the IEEE 1394-1995 standard.

15. (Currently Amended) ~~Adapter~~ The adapter device according to claim 1, wherein the lower level communication protocol is one of the ModBus, ModBus+, Uni-Telway ~~or any other~~ and a protocol using an RS-232, RS-485, RS-422 or current loop as ~~the~~ a physical layer.

16. (Currently Amended) ~~Adapter~~ The adapter device according to claim 1, wherein the lower level communication protocol is a protocol based on the Ethernet and TCP/IP standards.

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17. (Currently Amended) ~~Adapter~~ The adapter device according to claim 1, wherein the lower level communication protocol is selected from a ~~the~~ group composed consisting of the FIP, CAN, CANopen, Interbus-S, and DeviceNet protocols.

18. (Currently Amended) ~~Adapter~~ The adapter device according to claim 1, wherein the lower level communication protocol is a communication protocol based on the USB protocol.

19. (Currently Amended) ~~Configuration~~ A configuration process used in an ~~a~~ programmable adapter device according to claim 1, for communicating between a higher level communication protocol supported by a higher level equipment and at least one lower level communication protocol supported by a lower level automation equipment, the device comprising an adapter comprising a processing unit for executing program instructions, a first higher level interface for connecting with a second higher level interface in such higher level equipment, and a first lower level interface for connecting with a second lower level interface in such lower level equipment, wherein:

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the adapter comprises a first memory for storing a conversion program for converting between the higher level protocol and a lower level protocol, after being downloaded from a higher level equipment, and for being executed by the processing unit,

the adapter comprises a second non-volatile memory containing a resident driver program for execution by the processing unit to initialize communication with the higher level equipment using the higher level communication protocol and the conversion program into the first memory,

the process comprising:

~~• a recognition step (R) in which the adapter (20) determines and memorizes recognizing and storing a partial identifier (18a) or a complete identifier (18b) of a lower level protocol starting from means of recognising corresponding to the lower level connecting cable (14) connected to the adapter (20),~~

~~• a first identification step (I1) in which the adapter (20) communicates first communicating with the higher level equipment (30) using the higher level communication protocol to transmit the partial identifier (18a) or the complete identifier (18b) of the lower level protocol, to the higher level equipment,~~



• ~~a first downloading step (T1) in which the higher level equipment (30) downloads a first conversion program (15) for~~ converting ~~between the higher level protocol and the lower level protocol, into the adapter (20), said first conversion program~~ corresponding to the partial identifier (18a) ~~or the complete identifier (18b) of the transmitted lower level protocol.~~

20. (Currently Amended) Configuration ~~The configuration~~ process according to claim 19, wherein, when the lower level protocol identifier transmitted to the higher level equipment (30) during the first identification step (I1) ~~is a partial identifier (18a), the process comprises the following additional steps:~~

• ~~a learning step (A) in which the adapter (20) communicates~~ first communicating ~~with the lower level equipment (40) using the first conversion program (15) downloaded during the first downloading step (T1) in order to define and memorize~~ store ~~a complete identifier (18b) of the lower level protocol,~~

• ~~a second identification step (I2) in which the adapter (20) communicates~~ second communicating ~~with the higher level equipment (30) to transmit this~~ the ~~complete identifier (18b) to the higher level equipment,~~

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~~• a second downloading step (T2) in which the higher level equipment (30) downloads a second conversion program (15') for~~  
converting between the higher level protocol and the lower level protocol, into the adapter (20), said second conversion program corresponding to the complete identifier (18b) of the lower level protocol.

21. (Currently Amended) ~~Configuration~~ The configuration process according to claim 19, wherein, when the lower level connecting cable (14) is previously connected to the adapter (20), the process is started when the adapter (20) is connected to the higher level equipment (30) or at the request of the adapter (20).

22. (Currently Amended) ~~Configuration~~ The configuration process according to claim 19, wherein, when the adapter (20) is previously connected to the higher level equipment (30), the process is started when the lower level connecting cable (14) is connected to the adapter (20).

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IN THE DRAWINGS:

Please enter the attached three (3) sheets of formal drawings, Figures 1-4, to replace Figures 1-4 as originally filed.